

LITTLE COLORADO RIVER BASIN

09401000 LITTLE COLORADO RIVER AT GRAND FALLS, AZ

LOCATION.--Lat 35°26'45", long 111°12'12", in T.24 N., R.11 E. (unsurveyed), Coconino County, Hydrologic Unit 15020016, in Navajo Indian Reservation, on left bank 1,000 ft downstream from Grand Falls, 4.5 mi upstream from Dinnebito Wash, 30 mi northeast of Flagstaff, and 96 mi upstream from mouth.

DRAINAGE AREA.--21,068 mi², of which 368 mi² are noncontributing.

PERIOD OF RECORD.--November 1925 to September 1951, October 1951 to September 1953 (peak discharges only), October 1953 to June 1960, October 1989 to September 1994 (discontinued). Monthly discharges only for January to September 1950, published in WSP 1313.

REVISED RECORDS.--WDR AZ-89-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 4,438.9 ft above sea level.

REMARKS.-- Diversions above station for irrigation of about 29,000 acres. Some regulation by reservoirs above station (combined capacity, about 71,000 acre-feet in 1950, not including Long Pine Reservoir or Lake Mary).

AVERAGE DISCHARGE.--35 years (water years 1928-51, 1954-59, 1990-94), 247 ft³/s, 181,800 acre-ft/yr; median of yearly mean discharges, 210 ft³/s, 152,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,500 ft³/s Apr. 5, 1929, gage height 30.0 ft, no flow at times each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--A discharge of about 120,000 ft³/s, gage height 47.0 ft, from floodmarks, occurred on Sept. 19, 1923, and is the highest since 1870.

Annual peak discharges

Water year	Date	Annual peak discharge (ft ³ /s)	Discharge codes	Water year	Date	Annual peak discharge (ft ³ /s)	Discharge codes
1923	09-19-23	¹ 120,000	HP	1947	08-24-47	10,600	
1926	09-27-26	27,800		1948	10-16-47	12,400	
1927	06-28-27	28,800		1949	08-09-49	10,400	
1928	02-07-28	2,140		1950	07-18-50	3,500	
1929	04-05-29	50,500		1951	08-30-51	10,200	
1930	07-19-30	13,700		1952	01-20-52	26,100	
1931	08-01-31	6,530		1953	07-31-53	4,140	
1932	02-10-32	31,000		1954	03-25-54	7,450	
1933	09-12-33	7,500		1955	06-15-55	9,020	
1934	10-07-33	4,920		1956	08-17-56	2,320	
1935	04-10-35	7,350		1957	01-12-57	8,390	
1936	08-06-36	5,430		1958	08-23-58	4,560	
1937	02-09-37	21,800		1959	08-07-59	3,080	
1938	03-05-38	38,000		1960	11-01-59	7,960	
1939	04-05-39	6,680		1970	09-06-70	11,400	KR,HP
1940	07-27-40	20,100		1972	10-03-71	13,200	KR,HP
1941	03-15-41	17,000		1990	08-17-90	1,920	KR
1942	10-04-41	8,760		1991	04-11-91	3,320	KR
1943	09-28-43	3,900		1992	08-29-92	3,716	KR
1944	09-29-44	5,320		1993	01-11-93	16,600	KR
1945	08-12-45	4,650		1994	03-23-94	2,760	KR
1946	09-19-46	12,900					

¹Highest since 1870.

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Discharge rating table developed October 1989

Gage height (ft)	Discharge (ft ³ /s)	Gage height (ft)	Discharge (ft ³ /s)
7.0	390	25.0	34,790
8.0	955	28.0	44,020
10.0	2,680	31.0	54,080
13.0	6,550	34.0	64,940
16.0	11,820	38.0	80,600
19.0	18,360	41.0	93,210
22.0	26,100	43.0	102,000

Basin characteristics

Main channel slope (ft/mi)	Stream length (mi)	Mean basin elevation (ft)	Forested area (percent)	Soil index	Mean annual precipitation (in)	Rainfall intensity, 24-hour	
						2-year (in)	50-year (in)
10.5	234	6,440	33.0	2.7	12.9	1.5	2.9

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MEAN MONTHLY AND ANNUAL DISCHARGES 1927-49, 1951, 1954-59,
1990-91, 1993-94

MONTH	MAXIMUM (FT3/S)	MINIMUM (FT3/S)	MEAN (FT3/S)	STAN- DARD DEVI- ATION (FT3/S)	COEFFI- CIENT OF VARI- ATION	PERCENT OF ANNUAL RUNOFF
OCTOBER	927	0.00	116	229	2.0	3.7
NOVEMBER	287	0.00	45	75	1.7	1.4
DECEMBER	468	0.00	39	88	2.3	1.3
JANUARY	4,100	0.00	211	716	3.4	6.7
FEBRUARY	2,670	0.00	376	693	1.8	12.0
MARCH	2,390	0.00	644	659	1.0	20.6
APRIL	2,610	8.8	624	638	1.0	19.9
MAY	1,410	0.00	97	249	2.6	3.1
JUNE	622	0.00	30	117	3.9	1.0
JULY	1,580	0.00	163	311	1.9	5.2
AUGUST	1,990	0.00	475	482	1.0	15.2
SEPTEMBER	1,940	0.00	309	427	1.4	9.9
ANNUAL	811	26	260	204	0.78	100

MAGNITUDE AND PROBABILITY OF ANNUAL LOW FLOW
BASED ON PERIOD OF RECORD 1927-49, 1955-60, 1991-92, 1994

PERIOD (CON- SECU- TIVE DAYS)	DISCHARGE, IN FT3/S, FOR INDICATED RECURRENCE INTERVAL, IN YEARS, AND NON-EXCEEDANCE PROBABILITY, IN PERCENT					
	2 50%	5 20%	10 10%	20 5%	50# 2%	100# 1%
1						
3						
7						
14						
30						
60	0.00	0.00	0.00	0.00	0.00	0.00
90	0.58	0.00	0.00	0.00	0.00	0.00
120	7.1	1.4	0.17	0.00	0.00	0.00
183	55	20	11	6.8	3.8	2.5

MAGNITUDE AND PROBABILITY OF ANNUAL HIGH FLOW
BASED ON PERIOD OF RECORD 1927-49, 1951, 1954-59, 1990-91, 1993-94

MAGNITUDE AND PROBABILITY OF INSTANTANEOUS PEAK FLOW
BASED ON PERIOD OF RECORD 1923, 1926-60, 1990-91, 1993-94

DISCHARGE, IN FT3/S, FOR INDICATED RECURRENCE INTERVAL IN YEARS, AND EXCEEDANCE PROBABILITY, IN PERCENT					
2 50%	5 20%	10 10%	25 4%	50 2%	100 1%
8,310	17,280	26,100	41,500	56,800	76,000
WEIGHTED SKEW	(LOGS)=	0.38			
MEAN	(LOGS)=	3.94			
STANDARD DEV.	(LOGS)=	0.36			

PERIOD (CON- SECU- TIVE DAYS)	DISCHARGE, IN FT3/S, FOR INDICATED RECURRENCE INTERVAL, IN YEARS, AND EXCEEDANCE PROBABILITY, IN PERCENT					
	2 50%	5 20%	10 10%	25# 4%	50# 2%	100# 1%
1	5,170	10,100	14,400	21,100	27,000	33,700
3	3,780	7,130	9,880	13,900	17,300	21,100
7	2,520	4,400	5,690	7,320	8,500	9,640
15	1,780	2,990	3,690	4,420	4,860	5,230
30	1,210	2,040	2,540	3,080	3,430	3,720
60	789	1,440	1,920	2,540	3,010	3,470
90	566	1,080	1,490	2,070	2,550	3,060

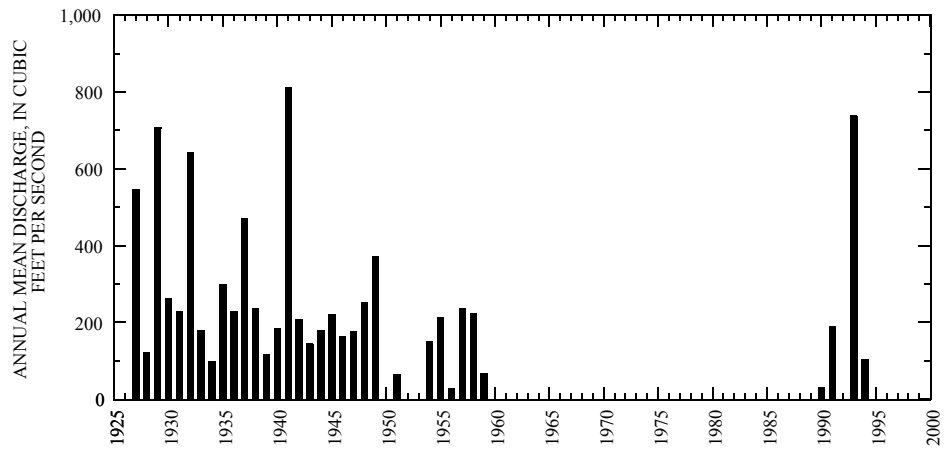
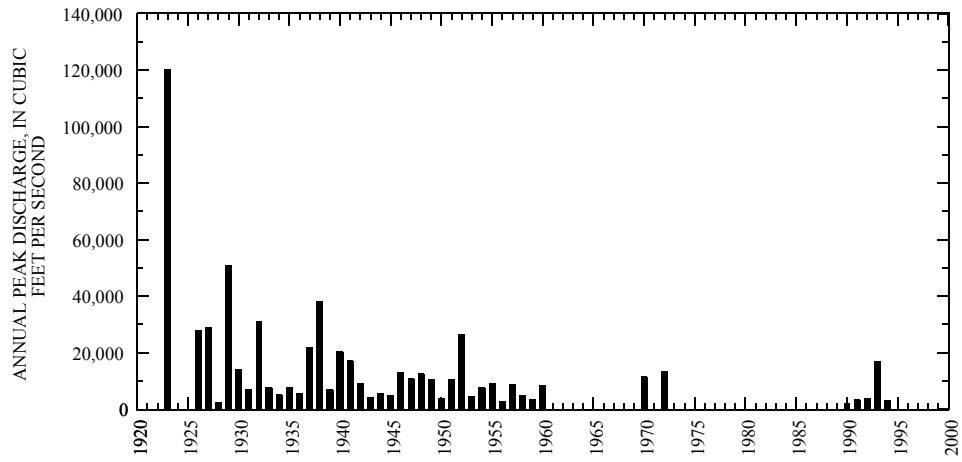
DURATION TABLE OF DAILY MEAN FLOW FOR PERIOD OF RECORD 1927-49, 1951, 1954-59, 1990-91, 1993-94

DISCHARGE, IN FT3/S, WHICH WAS EQUALED OR EXCEEDED FOR INDICATED PERCENT OF TIME																
1%	5%	10%	15%	20%	30%	40%	50%	60%	70%	80%	90%	95%	98%	99%	99.5%	99.9%
3,390	1,440	745	402	226	79	25	7.7	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Reliability of values in column is uncertain, and potential errors are large.

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